

**910.02.02 Self-Lubricating Bearing Assembly.** Self lubricating bearing assembly shall consist of a fabric reinforced elastomeric pad, Tetrafluoroethylene (TFE) bonded to the pad, and a stainless steel sheet. All the elements shall conform to AASHTO Standard Specifications for Highway Bridges as modified herein.

Fabric reinforced elastomeric pad shall be Type A, durometer hardness of 70 to 90. Stainless steel sheet shall be Type 304, minimum thickness of 16 gauge. The surface of the stainless steel sheet in contact with TFE shall have 2B finish, and shall be welded to the sole plate using a welding procedure approved by the Engineer.

**910.02.03 Preformed Fabric Pads for General Application.** Preformed fabric pads shall be composed of multiple layers of 8 oz cotton duck impregnated and bound with high quality natural rubber or of equally suitable materials, approved by the Engineer and compressed into resilient pads of uniform thickness, after compression and vulcanizing. The finished pads shall withstand compression loads perpendicular to the plane of the laminations of not less than 10 000 psi without detrimental reduction in thickness or extrusion.

## SECTION 911 — JOINTS

**911.01 JOINT SEALER AND CRACK FILLER.** Joint sealer and crack filler shall conform to D 3405 as modified by MSMT 404. The manufacturer shall furnish certification as specified in TC-1.02. Manufacturer's recommendations regarding heating and pouring temperatures will be used when testing these materials. If a range of temperatures is recommended, the midpoint will be used as the pour point.

**911.01.01 Silicone Joint Sealer And Crack Filler.** Silicone joint sealer and crack filler shall be low modulus, one component compound which may or may not require a primer for bonding to concrete. If a primer is required, it shall be as recommended by the sealant manufacturer and shall be placed on the joint faces following the insertion of the backup material.

Silicone material, when tested at  $73 \pm 3$  F and 45 to 55 relative humidity, shall conform to the following:

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Shore A Hardness, at 7 days	D 2240	10-25
Tensile Strength at 150 % Elongation, psi max	D 412 Die C	45
Elongation, % min	D 412 Die C	700
Adhesion in Peel, lb/in. min	Federal Spec TT-S-00230	20
Flow, 0.01 in. max	T 187	0.3
Tack-Free Time, minutes	D 2377	20-75

Each container of silicone sealer and crack filler shall have a minimum shelf life of six months. Material more than six months old shall be retested.

**911.02 PREFORMED JOINT FILLERS.** Preformed joint fillers shall conform to M 153. The bituminous fiber type shall conform to M 213, with the bitumen content determined using T 164. The weathering test shall be deleted for either type of material.

**911.03 PREFORMED JOINT INSERTS.** Preformed inserts shall conform to M 220.

**911.04 PREFORMED POLYCHLOROPRENE ELASTOMERIC COMPRESSION JOINT SEALS.** The manufacturer shall furnish certification as specified in TC-1.02.

**911.04.01 Roadway Seals.** Roadway seals for concrete pavement shall conform to M 220.

**911.04.02 Bridge Seals.** Bridge seals shall conform to M 297.

The minimum depth of all seals measured at the contact surface shall be at least 90 percent of the minimum uncompressed width of the seal.

**911.04.03 Lubricant Adhesive.** The lubricant adhesive shall be compatible with the preformed joint seals and concrete. The Engineer will determine if consistency is suitable at the time of installation.

The manufacturer shall furnish certification as specified in TC-1.02 showing that lubricant adhesive conforms to the following:

TEST AND METHOD	SPECIFICATION LIMITS
Viscosity, D 1084, Method B, CP min	25 000
Film Strength, D 412, psi min	2000
Elongation, D 412, % min	250

No lubricant adhesive shall be used after nine months from the date of manufacture. Each container shall be plainly marked with the manufacturer's name or trademark, lot number, and date of manufacture.

**911.05 NEOPRENE STRIP SEALS.** The manufacturer shall furnish certification as specified in TC-1.02 showing that the neoprene strip seals conform to the following:

<b>PHYSICAL PROPERTIES FOR PREFORMED ELASTOMERIC STRIP SEALS</b>		
<b>PROPERTY</b>	<b>REQUIREMENT</b>	<b>TEST METHOD</b>
Tensile Strength, psi min	2000	D 412
Elongation at Break, %, min	250	D 412
Hardness, Type A Durometer, points	60 ± 5	D 2240 (modified)(a)(c)
Oven Aging, 70 hr at 212 F Tensile Strength, % loss, max Elongation, % loss, max Hardness, Type A Durometer, points change	20 20 0 to + 10	D 573  D 2240 (modified)(a)(c)
Oil Swell, ASTM oil 3 70 hr at 212 F weight change, % max	45	D 471
Ozone Resistance 20% strain, 300 pphm in air, 70 hr at 104 F	No Cracks	D 1149 (modified)(b)
Low Temperature Stiffening 7 days at 14 F Hardness, Type A Durometer, points change	0 to + 15	D 2240  D 2240 (modified) (a)(c)
Compression Set, 70 hr at 212 F, % max	40	D 395 Method (modified) (b)(a)

- (a) The term "modified" in the table relates to the specimen preparation. The use of the strip seal as the specimen source requires that more applications than specified in either of the modified test procedures be used. The specimen modification shall be agreed upon by the purchaser and producer or supplier prior to testing.
- (b) Test in conformance with procedure A of D 518 and ozone concentration is expressed in pphm.
- (c) The hardness test shall be performed with the durometer in a durometer stand as recommended in D 2240.

**911.05.01 Special Molded Intersection Pieces.** Where joint elements intersect, a special strip seal element manufactured by molding in one piece from neoprene material similar to that specified above shall be 10 in. from point of intersection to nearest end along center line of joint in any direction. Ends shall be plane and square to facilitate bonding to adjacent extruded areas, and corners of sharp angles shall be rounded sufficiently to relieve damaging stress concentrations. Angles to which

moldings are fabricated shall be within 5 degrees of the actual angle as specified in the Contract Documents to avoid excessive deformation when installed in steel joint components.

Lubricant adhesive for use in installing and bonding neoprene seal elements to steel joint components shall be one part moisture curing polyurethane and hydrocarbon solvent mixture having the following physical properties:

TEST AND METHOD	SPECIFICATION LIMITS
Average Weight, lb/gal	$8 \pm 0.8$
Solids Content, % min	65
Adhesives shall remain liquid from, F	5 to 120
Film Strength, D 412, psi min	2000
Elongation, D 412, % min	250

Steel extrusions and neoprene seals shall be matching components by the same manufacturer. The steel extrusions shall have a minimum thickness of 3/8 in. All steel portions of the joint assembly shall be painted with an inorganic zinc rich primer conforming to 912.03. The primer shall be applied in conformance with Section 435.

**911.06 SEALER FOR LOOP DETECTOR.** Sealing material to seal saw cuts for loop detector wires shall be either Type A, two part epoxy or Type B, one part polyurethane. The manufacturer shall furnish certification as specified in TC-1.02. No aggregate shall be mixed with the sealer material. The sealer shall be applied in conformance with the manufacturer's recommendations.

**911.06.01 Tests.** Tests shall conform to the following:

<b>TYPE A – TWO PART EPOXY</b>	
<b>TEST AND METHOD</b>	<b>SPECIFICATION LIMITS</b>
Viscosity, cone and plate Viscometer@ 25 C, cps max	12 000
Pot life @ 25 C, minutes min	10
Cure time @ 25 C, no tackiness, hr max	1
Hardness, Type A durometer, D 2240	50 – 60
Tensile elongation, D 638, % min	100
Water absorption, D 570, %/24 hr max	0.5
Oil absorption, D 471, % max	0.02
Volume resistivity @ 25 C, D 257, ohm-cm min	$2.4 \times 10^{10}$
<b>TYPE B - ONE PART POLYURETHANE</b>	
<b>TEST AND METHOD</b>	<b>SPECIFICATION LIMITS</b>
Viscosity, Brookfield RVF #6 spindle @ 20 rpm 25 C, cps max	30 000
Cure time @ 25 C, no tackiness, hr max	24
Hardness, Rex Type A, min	70
Tensile strength, D 412, psi min	500
Tensile elongation, D 412, % min	300
ARC resistance, D 495, sec min	70
Dielectric constant, D 150, min	6 @ 50 hz 4.25 @ 500 khz
Nonvolatile content, %	85

**911.07 ROOFING PAPER.** Roofing paper to be used in expansion joints shall be composed of roofing felt saturated and coated on both sides with an asphaltic material. It shall not weigh less than 39.8 lb/100 ft<sup>2</sup> and shall not crack when bent 90 degrees over a 1/2 in. radius at room temperature.

**911.08 WATER STOPS.** Water stops shall be made of rubber or polyvinyl chloride (PVC).

The water stop shall be of the shape and dimensions specified in the Contract Documents. The cross section shall be uniform along its length

and transversely symmetrical so that the thickness at any given distance from either edge of the water stop shall be uniform.

The water stop shall conform to the following:

TEST AND METHOD	SPECIFICATION LIMITS
Tensile Strength, D 412, psi min	2000
Elongation @ Break, D 412, % min	300
Hardness, Rubber, Type A durometer, D 2240	55 ± 5
Hardness, PVC, Type A durometer, D 2240	75 ± 5

The Contractor shall furnish a test sample for each lot or shipment of water stop. The manufacturer shall furnish certification as specified in TC-1.02.

**911.09 ASPHALT SEALER FOR CONCRETE PIPE.** The sealer shall be a mixture of asphalt, mineral filler, and petroleum solvents, and shall have adhesive and cohesive properties. Each container shall be clearly marked with a lot number, manufacturer, and location of manufacturer.

The supplier shall furnish a certified copy of the test results showing that the sealer conforms to the following:

TEST AND METHOD	SPECIFICATION LIMITS
Residues by evaporation, nonvolatile matter, D 2939, % min	70
Inorganic filler on ignition, ash content, D 2939, %	15 – 45

**911.10 CLOSED CELL NEOPRENE SPONGE ELASTOMER.** Closed cell neoprene sponge elastomer shall conform to D 1056, Type S. Skin coating is optional. The material shall conform to the following:

TEST AND METHOD	SPECIFICATION LIMITS
Compression Deflection, D 1056	Pressure necessary for 25 % deflection, 5 – 10 psi, one layer 1/2 in. thick pad @ 70 ± 5 F
Accelerated Aging Test	Change in compression deflection after aging 7 days @ 158 F, 20 % max
Permanent Set*, D 1056	50 % deflection @ 158 F for 22 hr, 40 % max residual permanent set after 10 days recovery, 10 % max
Water Absorption by weight	2 in. immersion of 1.129 in. diameter sample for 24 hr @ room temperature, 10 % max
Water Resistance, D 1171	Quality retention, 6 weeks exposure, 100 %

\*Method to calculate permanent set:

$$\text{Permanent set} = \frac{(t_0 - t_1) \times 100}{t_0}$$

where:

$t_0$  = original thickness of sample, and

$t_1$  = thickness of specimen 30 minutes after removal of clamps or after 10 days recovery.

**911.11 NEOPRENE DRAINAGE TROUGHS.** Neoprene for drainage troughs shall conform to M 220, and the following:

PHYSICAL PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Tensile Strength, psi min	D 412	2000
Elongation at Break, % min	D 412	250
Hardness, Type A Durometer	D 2240 (modified)	60 ± 5
Compression Set, 22 hr @ 212 F, % max	D 395	35
Oven Aging, 70 hr @ 212 F		
Tensile Strength, % loss max	D 573	20
Elongation, % loss max		20
Hardness, Type A Durometer (points change)		0 to + 10

**911.12 PREFORMED FABRIC DRAINAGE TROUGHS.** Optional performed fabric drainage trough shall be a sheet composed of multiple plies of  $15 \pm 5$  oz/yd<sup>2</sup> polyester fabric laminated with butadiene

acrylonitrile, vulcanized to form an integral laminate. Physical properties of the laminate shall conform to the following:

PHYSICAL PROPERTY	SPECIFICATION LIMITS
No. of Piles	3
Laminate Weight, psf	0.85
Thickness, in. min	5/32
Tensile Strength, lb/in. of width, min	1200
Elongation at Tensile, % max	30
Elongation at 1/10 Tensile Strength, % max	3

**911.13 SHIMS FOR NOISE BARRIER INSTALLATION.** Shims for noise barrier installation shall be either neoprene or composite elastomer with a durometer of  $60 \pm 5$  (Shore A) value.

## SECTION 912 — COATING SYSTEMS FOR STRUCTURAL STEEL

**912.01 GENERAL.** The Office of Materials and Technology will maintain a list of Approved Paint Manufacturers. Only manufacturers on this list will be acceptable as sources for paint on Administration projects. Unless otherwise specified, paint shall be tested in conformance with Federal Test Method Standard 141. Only one formulation per color will be permitted per project. Tests shall be performed at 75 F and 50 percent relative humidity unless otherwise specified. All paint shall be satisfactory for brushing, rolling, or spraying. All paints within a system shall be from the same manufacturer and shall be tinted at the point of manufacture to differentiate between coats, existing coats, and bare metal. Paint shall be shipped in the original containers and all containers shall bear the identification of the paint, consisting of the manufacturer's name, the name or title of material, volume of contents, manufacturer's paint identification number, the date of manufacture, color name and number, handling instructions, precautions, and the batch number.

**912.01.01 Approved Paint Manufacturers.** Admission onto the list of Approved Paint Manufacturers will be based upon the acceptance of the manufacturer's submitted Quality Control Plan.

**912.01.02 Quality Control Plan.** The Quality Control Plan shall define the manufacturer's process to ensure that the quality of the products